

GROUP I: Adding, Subtracting, and Scalar Multiplication

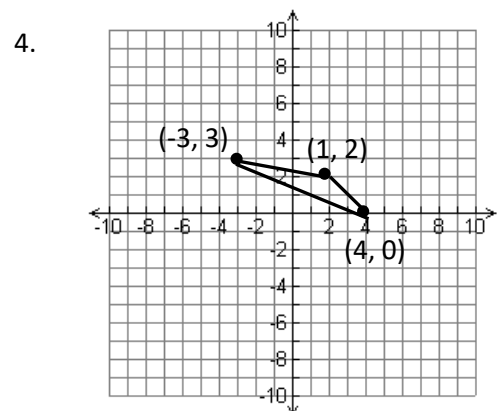
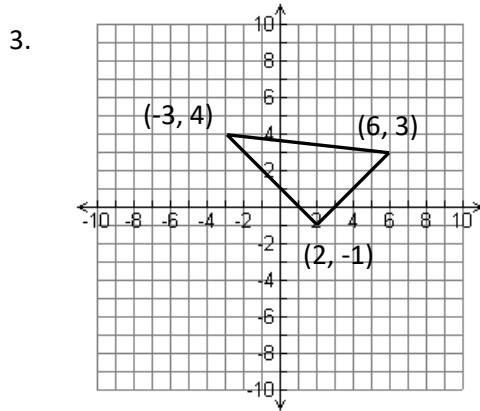
Solve for X when: $A = \begin{bmatrix} -2 & -1 \\ 1 & 0 \\ 3 & -4 \end{bmatrix}$ $B = \begin{bmatrix} 0 & 3 \\ 2 & 0 \\ -4 & -1 \end{bmatrix}$

1. $X = 3A - 2B$

2. $2X + 3A = B$

GROUP II: Determinants and inverses.

Use a determinant to find the area of the given triangles:



5. Find: $\begin{vmatrix} 3 & -2 & 1 \\ 4 & -2 & 1 \\ 0 & 3 & -2 \end{vmatrix}$ by hand and then check with your calculator.

6 – 8: Find the inverses of the given matrices.

6. $\begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$

7. $\begin{bmatrix} 2 & 3 \\ 7 & 11 \end{bmatrix}$

8. $\begin{bmatrix} 8 & -3 \\ 4 & -2 \end{bmatrix}$

GROUP III: Solving systems using inverses.

9 - 11: Write the matrix equation, determine the determinant, find the inverse matrix, and solve for the solutions using inverses.

$$9. \begin{cases} x - 3y = 10 \\ 2x + 5y = -2 \end{cases}$$

$$10. \begin{cases} x + 4y + 2z = 1 \\ -x + 5y + 2z = 3 \\ 4x + z = -5 \end{cases}$$

$$11. \begin{cases} -5x + 4y = -2z + 2 \\ y = 3z - 6 \\ -4x + 3y = -2z + 1 \end{cases}$$

GROUP IV: Solving systems using Cramer's Rule.

12 – 14: Solve the following equations using Cramer's Rule:

$$12. \begin{bmatrix} 5 & 6 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ -5 \end{bmatrix}$$

$$13. \begin{bmatrix} -1 & -1 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} + \begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} -5 \\ 0 \end{bmatrix}$$

$$14. \begin{bmatrix} 0 & 1 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} - \begin{bmatrix} 10 \\ -3 \end{bmatrix} = \begin{bmatrix} -8 \\ 5 \end{bmatrix}$$

GROUP V: Matrix Transformations.

Perform the indicated transformation: *(If you have to sketch the segment, point, or triangle to get a visual)*

$$A = \begin{bmatrix} 7 & 3 \\ 5 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 2 & 3 \\ 7 & 11 \end{bmatrix}$$

$$C = \begin{bmatrix} 8 & -3 \\ 4 & -2 \end{bmatrix}$$

$$D = \begin{bmatrix} -1 & 2 & 0 \\ 3 & -5 & 4 \\ -6 & -2 & 1 \end{bmatrix}$$

$$E = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

15. Translate A up 4 and left 2.

16. Dilate D with a reduction of one-third.

17. Reflect E over the x-axis.

18. Reflect C over the y-axis.

19. Rotate B 90 CCW about the origin.

20. Rotate A 180 clockwise about the origin.

GROUP VI: Multiplication with matrices.

Write the product as a single matrix:

$$21. \begin{bmatrix} 1 & 0 \\ 4 & 9 \end{bmatrix} \begin{bmatrix} -1 & 1 \\ 3 & 2 \end{bmatrix}$$

$$22. \begin{bmatrix} 6 & 6 & 0 \\ 1 & -1 & 5 \end{bmatrix} \begin{bmatrix} -6 & 1 & 4 \\ 5 & -2 & 1 \\ 3 & -8 & 0 \end{bmatrix}$$

$$23. \begin{bmatrix} 10 & 2 & 1 & 5 \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ -2 \\ 3 \end{bmatrix}$$

GROUP VII: Determinants.

Evaluate each of the following:

(Do at least one of each by hand (show your work) the others can be done on the calculator.)

24. $\begin{vmatrix} 6 & -3 \\ 2 & 1 \end{vmatrix}$

25. $\begin{vmatrix} -2 & -6 \\ 1 & 4 \end{vmatrix}$

26. $\begin{vmatrix} 9 & 1 \\ -3 & 2 \end{vmatrix}$

27. $\begin{vmatrix} 4 & 1 \\ 0 & 6 \end{vmatrix}$

28. $\begin{vmatrix} 2 & 1 & 5 \\ -1 & 6 & 3 \\ 2 & -4 & 2 \end{vmatrix}$

29. $\begin{vmatrix} -3 & 1 & 0 \\ 2 & -1 & 1 \\ 0 & 3 & 4 \end{vmatrix}$

30. $\begin{vmatrix} 2 & -3 & 4 \\ 0 & 1 & -2 \\ 1 & 2 & -3 \end{vmatrix}$

GROUP VIII: Adding, Subtracting, and Scalar Multiplication.

Perform the matrix operation(s): *(check with your calculator, but do these by hand)*

31. $\begin{bmatrix} 0 & 1 & -5 \\ 4 & 1 & 6 \end{bmatrix} + \begin{bmatrix} 10 & 3 & 11 \\ -2 & 8 & 3 \end{bmatrix}$

32. $\begin{bmatrix} 5 & 1 & 10 \\ -1 & 0 & 0 \\ 2 & 3 & 4 \end{bmatrix} - \begin{bmatrix} 6 & 7 & 3 \\ 0 & 14 & 6 \\ 1 & -1 & 2 \end{bmatrix}$

33. $\begin{bmatrix} 6 & 10 \\ 9 & 6 \\ 4 & -1 \end{bmatrix} + \begin{bmatrix} 2 & 1 \\ 0 & 7 \\ 4 & 7 \end{bmatrix}$

34. $3 \begin{bmatrix} 4 & 6 & -1 \\ 10 & -5 & 2 \\ 2 & 11 & 1 \end{bmatrix}$

35. $-2 \left(\begin{bmatrix} 6 & 4 \\ 0 & 3 \end{bmatrix} - \begin{bmatrix} 5 & 10 \\ 1 & 3 \end{bmatrix} \right)$